

Green Pond Subwatershed Falmouth, Cape Cod, Massachusetts

The Green Pond Subwatershed is located in East Falmouth and Sandwich. It has an area of 2,849 acres. Green Pond opens to Vineyard Sound at its southern boundary. The portion of the subwatershed south of Route 28 is intensely developed with residences surrounding all of Green Pond. The subwatershed extends to the north into the Massachusetts Military Reservation. It contains more than 2,200 homes and its population is projected to be 4,200 at build-out.

Over the past 15 years the water quality in Green Pond has steadily decreased. In 1999, water sampling revealed that the water from the northern tip of the pond to just south of the Green Pond Bridge was “Significantly Impaired.” The water from south of the bridge to Nantucket Sound was of “Moderate Quality.” From the bridge northward, for more than half of the pond’s length, the water was classified as “Severely Degraded.” Data show that the zone of eutrophication is continuing to extend from the upper reaches of the pond toward the sound. Conclusions are that nitrogen-loading causes most areas of the pond to be significantly impaired to severely degraded, that home septic systems and fertilizer use causes two thirds of the nitrogen-load, and that eliminating the great majority of that nitrogen-load will restore reasonably acceptable quality to the pond. Possible options for remedy include administrative measures, such as bylaws and regulations, and engineered measures, such as new septic systems, sewers with central treatment plants, and constructed wetlands.

The Massachusetts Division of Marine Fisheries conducted a Sanitary Survey along the Green Pond shoreline in 1992. The survey identified 14 locations where there is evidence of stormwater discharge or road runoff into the pond.

The Massachusetts Military Reservation (MMR) has had environmental impacts on this watershed. Past oil, fuel, chemical, and hazardous waste disposal activities on the base have created groundwater pollution plumes, one of which is located within this watershed. The Air Force Center for Environmental Excellence (AFCEE) is investigating and addressing this groundwater pollution.

The water quality problems in the watershed are associated with nitrogen loading into Green Pond. One future cause of nitrogen loading will be the Ashumet Nitrogen Plume, which emanates from a now-closed wastewater treatment plant on the MMR. The plume is heading towards Bourne Pond, but has not yet reached it. The nitrogen in the plume will increase nitrogen loading in the three ponds by about 2%. In 1998, the US Air Force gave Falmouth \$8.5 million to fund measures to offset nitrogen loading in Great, Green, and Bourne’s Ponds. The Ashumet Plume Citizens Committee was appointed by the town to make recommendations for such offset measures.

It is estimated that at build-out, 51% of the nitrogen load in the Green Pond watershed will come from septic systems and 17% from home lawns. Fertilizer from golf courses and cranberry bogs will add another 8%. While action can be taken to reduce the nitrogen coming from septic systems and fertilizer, it will not be possible to reduce the nitrogen emanating from atmospheric deposition (21% of the total load) and the Ashumet Valley Plume (3%).

Approximately five percent of Falmouth is publicly sewered. The sewered areas are Main Street in Falmouth and nearly all of Woods Hole. About ninety-five percent of the town is on municipal water. There is one treatment plant in Falmouth, processing 550,000 gallons per day (gpd) with a capacity of 810,000 gpd and discharging to groundwater. A \$14 million upgrade has been approved to bring the capacity up to one million gpd in the next few years.

Stewards:

- Falmouth Pond Watchers
- Ashumet Plume Citizens Committee
- Falmouth Associations Concerned with Estuaries and Saltponds (FACES)

Studies conducted in the watershed:

- DMF completed a Sanitary Survey along the Green Pond shoreline in October 1992.
- Water Quality Monitoring of Falmouth's Coastal Ponds: Results from the 1997 Season. Falmouth Pond Watchers. June 1998. A similar document is also available the 1994-95 and 1996 sampling seasons.
- Ashumet Plume Nitrogen Offset Program. Report of the Ashumet Plume Citizens Committee: Water Quality Assessment, Conclusions, and Program Options. October 27, 2000. (View history, progress reports, and recommendations of the program at www.geocities.com/ashumet2001).
- Study of sources of nitrogen entering Green Pond, conducted through the Boston University Marine Program in 2001.
- Cape Cod Atlas of Tidally Restricted Salt Marshes. 2001. Cape Cod Commission.
- Green Pond was selected as a priority area for the Estuaries Project - Southeastern Massachusetts Embayment Restoration, funded by the state and UMass Dartmouth. The goal of the project is to develop critical nutrient loading thresholds for each embayment to aid in water resources planning and that will support federal requirements for the development of Total Maximum Daily Loads for impaired surface waters. This area was evaluated in 2002.

Who is collecting water quality data and where:

- Falmouth Pond Watchers sample Green Pond once every two weeks in July and August. Data is collected on depth; salinity; dissolved oxygen; water temperature, clarity and color; and a host of nutrients including nitrate-nitrogen, nitrite-nitrogen, and phosphate. (View data at www.state.ma.us/czm/falmouth_pond_watchers.htm).
- The United States Geological Survey maintains a stream flow gauge in Green Pond, collecting data that will be used in the Massachusetts Estuaries Project.

Management actions taken:

- The state controlled launching ramp at Green Pond is scheduled for reconstruction.
- A new shellfish upweller platform and dingy dock were constructed in Green Pond South (2000).
- The Ashumet Plume Citizens Committee recommended in December 2001 that the Town of Falmouth spend up to \$2.5 million or more to buy the cranberry bogs at the headwaters of Green and Bournes Ponds and use these wetlands to prevent nitrogen from getting to the ponds.

Subwatershed facts: (For data sources see Appendix)

- 21 E sites: 5 on the Massachusetts Military Reservation
- Solid waste sites: 1
- Zone IIs located in this watershed: 2
- Interim Wellhead Protection Areas (IWPAs): 1
- Percent of the undeveloped land that is protected (according to 1985/1990 data): 32%
- Acres of existing wetlands: 18
- Certified vernal pools: none
- Named ponds: Green, Mill, and Flax

- Named rivers or creeks: Green River, Backus Brook
- Shellfish growing areas: Green Pond – conditionally approved for shellfish harvesting.
- This watershed contains Natural History and Endangered Species Program (NHESP) Estimated Habitats of Rare Wildlife.

Priorities:

- Develop critical nutrient loading thresholds for Green Pond to aid in water resources planning and the development of TMDLs.
- Town of Falmouth needs to implement long term solutions to nutrient overloading in this coastal pond to offset threats to water quality, recreational uses of the pond, habitat, and aesthetics.
- Town of Falmouth should refer to the DMF Sanitary Survey (1992) to prioritize the 14 sites identified for stormwater remediation along the Green Pond shoreline.
- Flax and Mill Ponds need volunteers to participate in the Pond and Lakes Stewardship Project (PALS), measuring water quality and other characteristics of the ponds.
- Implement those salt marsh restoration projects identified in the 2001 *Cape Cod Atlas of Tidally Restricted Salt Marshes* that have been evaluated and prioritized by the town. The site in this subwatershed is the Menauhant Road restriction of Green Pond (Site FA-6).
- Acquire open space. Parcels considered a priority for acquisition for water supply protection and development: Falmouth Tracts 4, 6, 11, 12, 19, 26, 33, and 35 were ranked as having medium or high water supply development potential in the Cape Cod Commission's *Priority Land Acquisition Assessment Project* (April 1999). These tracts are located throughout the Town of Falmouth.

Recreation:

Camping areas: none

Golf courses:

- Paul Harney Golf Course

Pathways and trails:

- Crane Wildlife Management Area
- Ashumet Holly & Wildlife Sanctuary
- www.capecodcommission.org/pathways/trailguide.htm

Public access:

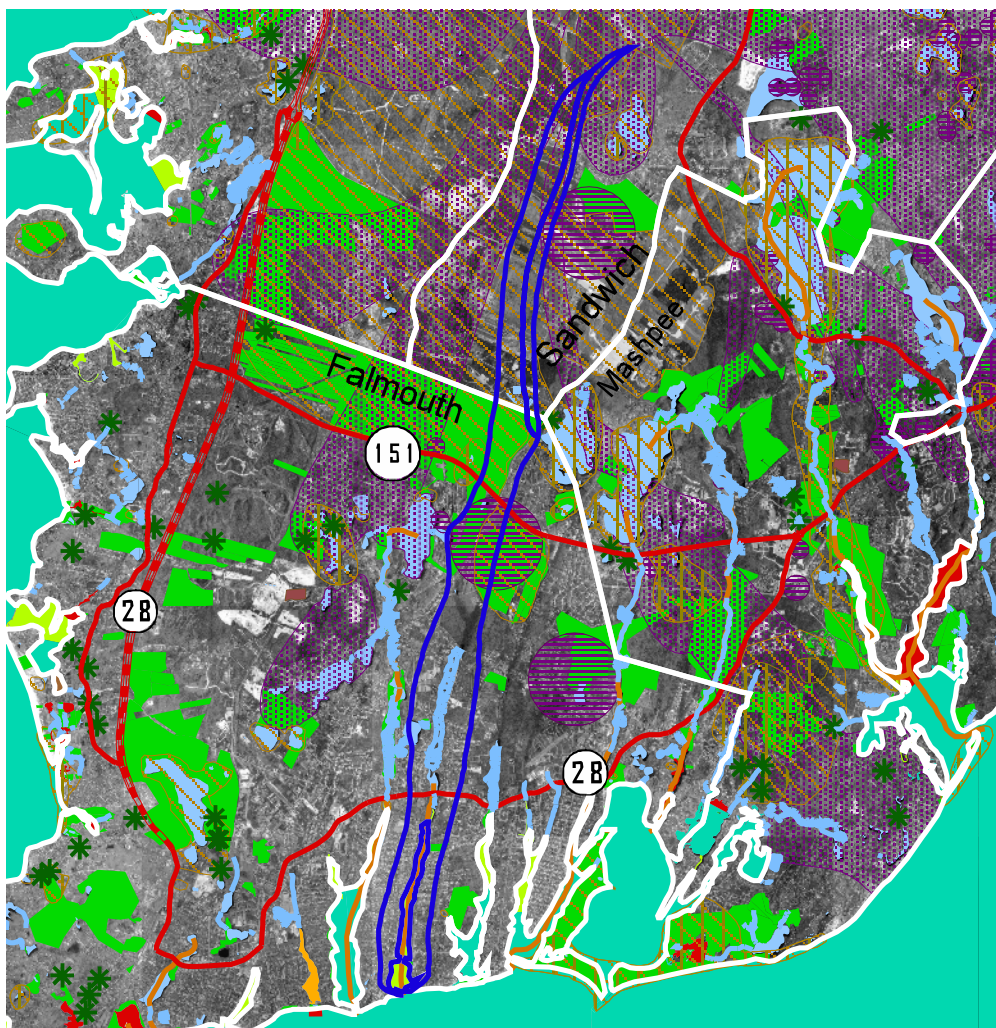
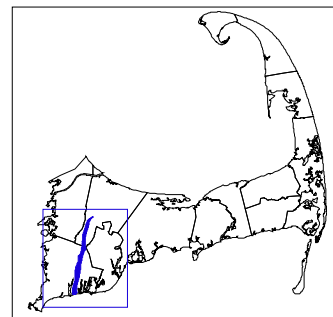
- www.state.ma.us/dfwele/pab/pabSEmap.htm

Public beaches and landings:

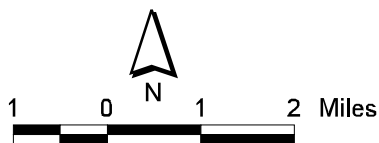
- Landing on southeastern shore of Green Pond
- Landing on Ashumet Pond

Green Pond

Falmouth and Sandwich, MA



Watershed Resources



Natural Heritage and Endangered Species Program Data

- Certified Vernal Pool
- Priority Habitats of Rare Species
- Estimated Habitats of Rare Species

Groundwater Protection Areas

- Interim Wellhead Protection Area
- Zone II
- Solid Waste Facility

Watershed Boundary

Anadromous Fish Run

Shellfish Growing Areas

- APPROVED
- CONDITIONALLY APPROVED
- MANAGEMENT CLOSURE
- PROHIBITED
- RESTRICTED
- Open Space

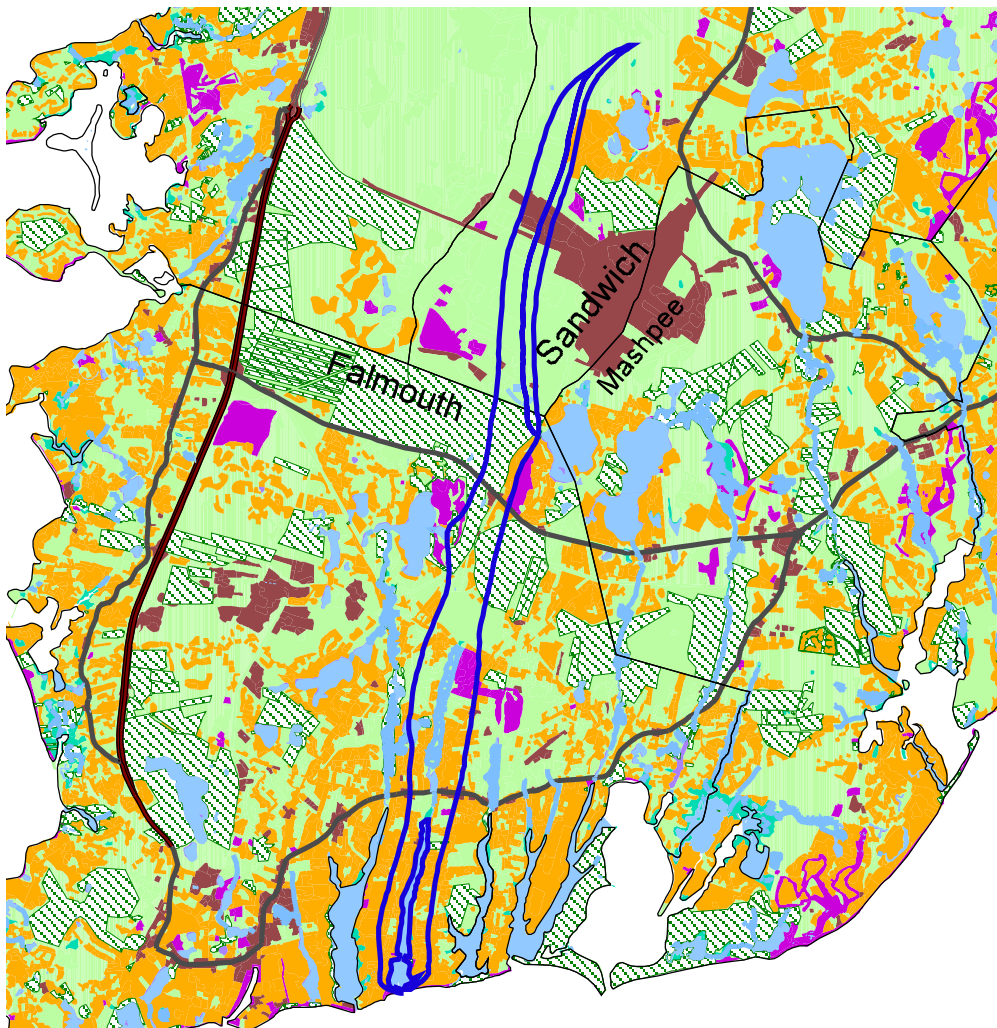
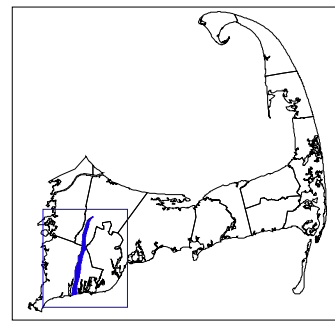
Streams

Ponds

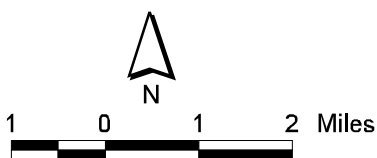
Roads

Green Pond

Falmouth and Sandwich, MA



Land Use



Land Use

